

REMARKS

Claims 1 through 15 and 17 through 61 are now pending in the application. The amendments to the specification previously submitted in Applicants' November 29, 2001 Preliminary Amendment are again submitted in this Response, but in proper form and with minor revisions. The amendments to the specification do not introduce new matter to the specification. The amendments made to previously submitted Claims 1 through 24 simply improve grammar and do not present new matter and are broadening in nature, thereby not limiting any equivalents. Finally, Claims 25 through 61 have been added to better claim Applicants' invention and are broadening in nature, thereby not limiting any equivalents. New claims 25 through 61 do not present new matter. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

SPECIFICATION

Applicants filed a preliminary amendment on November 29, 2001 making amendments to the specification. The Examiner refused to enter the amendments because they were not in the proper format. Specification amendments are hereby submitted in the proper format. As the amendments to the specification are now in the correct format, Applicants respectfully request that the Examiner enter the amendments. The amendments do not introduce new matter into the specification.

AMENDED CLAIMS 1 THROUGH 24

Claims 1 through 24 have been amended to improve their grammar. The amendments to Claims 1 through 24 do not present new matter, are equivalent or broader in scope to the claims as originally filed, and are not narrowing amendments. Applicants note that this Amendment, unlike the Preliminary Amendment, properly numbers Claims 16 through 24 such that the claims retain their original claim numbers, despite the cancellation of Claim 16. Applicants respectfully request entry of the amendments to Claims 1 through 24.

REJECTION UNDER 35 U.S.C. § 103

Claims 1 – 12, 15 – 19, and 22 – 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hofmann et al. (U.S. Pat. No. 5,938,945). This rejection is respectfully traversed. It is believed that the originally filed claims are patentably distinct over the cited reference.

Notwithstanding, amended independent Claim 1 recites, in part, a welding process comprising “cleaning a surface of a component by applying a first voltage so as to strike an arc between a stud, which is to be connected to the surface, and the surface.” Further, amended independent Claim 15 recites, in part, “a welding voltage polarity reverser device operable with the programmed device to provide a cleaning current that has a polarity opposite that of the welding current....” The Examiner admits that Hofmann et al. fails to disclose all elements of either Claim 1 or Claim 15. In particular, the Examiner admits that Hofmann et al. fails to disclose a cleaning step. However, the Examiner asserts that Claims 1 and 15 are obvious because “it is

considered obvious that [t]he initial polarity arc in Hofmann et al. will to some extent clean the workpiece because the heat of the arc will obviously vaporize or burn away any detritus on the workpiece.” The Examiner fails to provide any supporting evidence for this conclusion. Furthermore, all of the Examiner’s assumptions are hereby challenged as lacking support and/or being incorrect.

To establish a prima facie case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. See MPEP § 2143. It is never appropriate to rely solely on alleged common knowledge in the art without evidentiary support in the record, as the principal evidence upon which a rejection is based. See MPEP § 2144.03(A) (citing *In re Zurko* for the proposition that “[t]he Board cannot simply reach conclusions based on its own understanding or experience – or its assessment of what would be basic knowledge or common sense.”).

The Examiner’s rejection is improper because Hofmann et al. provides no suggestion or motivation for its modification to produce the claimed invention. Further, the rejection is improper because the Examiner cites no prior art and gives no evidentiary support for his assertion that one of ordinary skill in the art would find it obvious or desirable to modify Hofmann et al. to arrive at the claimed invention.

A detailed discussion of the foreign reference upon which Hoffman et al. relies upon for priority, German Patent No. DE 195 24 490, is provided on pages 1 through 4 of Applicant’s application. These pages clearly describe how Applicant’s invention is patentably distinct from Hoffman et al. Specifically, Applicant’s application clearly states

that its invention provides, unlike Hoffman et al., a lift-and-strike welding process and a corresponding lift-and-strike welding apparatus, with which an element that may be welded onto a surface, “even if a coating should be disposed on the surface.” Applicant’s application further states that the coating may be, for example, an organic coating, zinc, dirt, or the like. Hoffman et al. fails to provide a lift-and-strike welding apparatus or process that permits welding in the presence of a surface coating.

It is well known in the art that coatings and dirt present on a welding surface negatively affect the welding process (See U.S. Patent No. 5,389,761, col. 1, lines 11 through 29; and, American Iron and Steel Institute, Automotive Steel Design Manual, page 4.3-2 (1986)(relevant page attached)). However, the prior art fails to provide a solution to this problem for lift-and-strike welding. Applicant’s invention fulfills a need in the art by providing a lift-and-strike welding apparatus and process that permits the welding of an element onto a surface even if a coating is present on the surface.

As the Examiner’s § 103 rejection fails to render obvious Claim 1 and Claim 15, and those claims dependent therefrom, reconsideration and withdrawal of this rejection is respectfully requested.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt

and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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A downslope period where current gradually decays may also be programmed. After a short off time, other heat cycles may be programmed; for hard to weld materials, a low heat (i.e., low current) temper cycle may be used. Finally, the weld cycle ends with a hold time to reduce the temperature around the nugget and assure proper coalescence of the spot weld.

As indicated, the spot welding process is capable of rapidly joining two or more parts and is thus ideally suited for sheet bonding. Such parts as mounting brackets, body panels, sheet metal parts, and production metal subassemblies are welded with the resistance spot welding process. It is estimated that in an average size car there are over 5,000 resistance spot welds.

4.3.1.2 Typical Parts

The major advantage of the resistance spot welding process is the relative speed with which welds can be made and the low cost. In addition, weldable materials can be successfully welded over a wide range of welding variables. There are, however, some major disadvantages to using this process. An improper selection of welding parameters, outside the acceptable limits, may result in inferior welds.

4.3.1.3 Advantages and Disadvantages

At low weld parameter values, no visually inspectable indications of low strength can be observed. At high weld parameters, excessive expulsion of liquid metal during welding occurs. Part fit-up is also quite critical. Misfitting parts require part of the welding force to push them into place and thus can disturb the weld integrity. In addition, welds made too close to edges can cause an improper weld to be made and result in excessive expulsion. Welds placed too close to each other can also result in weld current shunting through a previous weld, causing the present weld to be undersized.

In addition to the above mechanical effects, factors such as joint design, steel chemistry, steel cleanliness, material processing and surface conditions can also affect the resistance spot weldability^{1*}.

Successful weldment design requires understanding of both the weldability of the material and the weld joint placement. The description and references cited below will provide the basis for design using the resistance spot weld process. However, consultation with each automotive company's welding design specifications is recommended.

4.3.1.4 Design Considerations

* Numbers designate references at the end of this section.